

Children's knowledge and skills at kindergarten entry in Illinois: Results from the first statewide administration of the Kindergarten Individual Development Survey

At least half of states administer or are developing kindergarten entry assessments. In fall 2017 the Illinois State Board of Education began requiring teachers to report data on every child's skills at kindergarten entry using the Kindergarten Individual Development Survey. State and local stakeholders have asked for more information on the reliability and validity of the survey and on the gaps in children's skills at school entry. This study analyzed the psychometric properties of the 14 required items on the survey after its first statewide administration. It examined average skills and the variation in skill levels at kindergarten entry, as well as their differences across child subgroups and school poverty levels. And it interviewed teachers and principals about barriers in administering the survey and suggestions for improvement.

The study found that the survey measures two developmental domains: learning and social skills, and academic knowledge and skills. Measures of these domains are psychometrically reliable and valid. Nearly 9 in 10 children (88 percent) had a score below the scale's midpoint for the learning and social skills domain, and 85 percent had a score below the scale's midpoint for the academic knowledge and skills domain. The percentage of children in a school who were eligible for the national school lunch program was negatively associated with academic knowledge and skills at kindergarten entry, even after child-level eligibility for the program was controlled for. Teachers and principals reported multiple challenges in administering the survey—including difficulties observing all skills for every child, choosing between adjacent rating categories, and entering data into the online portal—and had several suggestions for improvement.

Why this study?

At least half of states administer or are developing kindergarten entry assessments. The Illinois State Board of Education—in partnership with an advisory committee of experts in early childhood education and child development and the WestEd Center for Child and Family Studies—adapted a California kindergarten entry assessment to create the Kindergarten Individual Development Survey. The state required all kindergarten teachers to use this kindergarten entry assessment statewide for the first time in the 2017/18 school year. Because of the potential influence of the survey results in the classroom and on early childhood education policy, members of the Midwest Early Childhood Education Research Alliance asked for more information on the survey's reliability and validity (see box 1 for definitions of these and other key terms used in the brief), patterns in the data, and teachers' and principals' experience administering the survey.

What was studied and how?

The study addressed seven research questions in three categories:

Psychometric research questions

1. Does the Kindergarten Individual Development Survey measure the three developmental domains found during the 2014/15 pilot administration of the survey (language and literacy development, cognition: mathematics, and approaches to learning/social-emotional development)?
2. Are the measures of the developmental domains valid across child subgroups?

Descriptive research questions

3. What knowledge and skills do Illinois children have at kindergarten entry, on average, and how do knowledge and skills vary within each developmental domain?
4. Are there differences in children's knowledge and skills at kindergarten entry across key subgroups (such as children eligible for the national school lunch program and those not eligible, boys and girls, English learner children and non-English learner children, children eligible for an individualized education program and those not eligible, and children of different races/ethnicities)?
5. Is there an association between the percentage of children in a school who are eligible for the national school lunch program and academic knowledge and skills at kindergarten entry? Does the association exist after other child-level characteristics are controlled for?

Qualitative research questions

6. What barriers did teachers and principals encounter in administering the survey in its first statewide administration?
7. What suggestions do teachers and principals have for improving survey administration?

Box 1. Key terms

Domain. An area of knowledge within a child's school readiness—for example, social-emotional development, language and literacy skills, or math.

Eligibility for the national school lunch program. Used in this study as a proxy for economic disadvantage. The national school lunch program is designed to benefit children whose families have unmet economic needs or children who attend schools with high numbers of children whose families have unmet economic needs.

Eligibility for an individualized education program. An indication of whether a child is eligible to receive special education services.

Factor. A representation of a trait that is not on its own observable or measurable but is reflected by individual items that are statistically similar in response patterns.

Item. An individual question on the Kindergarten Individual Development Survey.

Rating. One of six categories that teachers report that best represents a child's developmental stage for an item on the Kindergarten Individual Development Survey. Though the anchors for the rating categories differ across items, the names of the rating categories are the same: building—earlier, building—middle, building—later, integrating—earlier, integrating—middle, and integrating—later.

Reliability. The reproducibility of an estimate. In this study it is the probability that children estimated to have higher skills than other children actually do have higher skills.

Sum-score index. A teacher's average rating for a domain across all its items. It is calculated by converting the ratings on individual items to a numerical scale, summing the converted ratings across individual items, and dividing the sum by the number of items over which the sum was calculated. The study reports sum-score indexes (rather than scale scores, which are on a continuous scale and generated based on statistical models) because of the ease of interpretation.

Validity. The extent to which the scale or sum-score index measures the domain that it is intended to measure.

Data and methods

The study used teacher ratings for 113,716 children on 14 items from the fall 2017 administration of the Kindergarten Individual Development Survey. It also used child demographic data provided by the Illinois State Board of Education, school-level data on the percentage of children eligible for the national school lunch program from the U.S. Department of Education's Common Core of Data, and interviews with a sample of one kindergarten teacher and one principal from each of nine schools. The study team analyzed the quantitative data using psychometric analyses and multilevel modeling. (Multilevel modeling is often employed to analyze student data because it accounts for the fact that students who are educated within the same schools and districts tend to be more alike in their characteristics than children chosen at random from the population at large.) And it analyzed data from the teacher and principal interviews by coding transcripts for themes that emerged from the data and were found in the literature on developing early childhood education assessments.

Findings

- **Analyses of data from the 2017/18 administration of the Kindergarten Individual Development Survey support the presence of two developmental domains: learning and social skills, and academic knowledge and skills.** This contrasts with the finding based on pilot data from the 2014/15 school year, that the survey measures three developmental domains: language and literacy development, cognition: mathematics, and approaches to learning/social-emotional development. Measures of the two developmental domains were valid across all child subgroups. The learning and social skills domain included seven items related to communication and use of language (expressive), reciprocal communication and conversation, relationships and social interactions with familiar adults, relationships and social interactions with peers, curiosity and initiative in learning, self-control of feelings and behavior, and engagement and persistence. The items within the learning and social skills domain were strongly correlated with one another (estimated internal consistency of .94). The academic knowledge and skills domain included seven items related to comprehension of age-appropriate text, phonological awareness, letter and word knowledge, classification of objects into groups based on their attributes, number sense of quantity, ability to add and subtract small quantities, and knowledge of shapes. The items within the domain were strongly correlated with one another (estimated internal consistency of .92).
- **Measures of the two identified developmental domains were valid across all child subgroups.** The study examined whether the survey consistently measured learning and social skills and academic knowledge and skills in the same way across eligibility for the national school lunch program, gender, English learner status, eligibility for an individualized education program, and race/ethnicity. Measures of the two domains were assessed to be reliable and valid across all subgroups.
- **Nearly 9 in 10 children (88 percent) had a score below the scale's midpoint for the learning and social skills domain, and 85 percent had a score below the scale's midpoint for the academic knowledge and skills domain.** The average score was 2.5 for the learning and social skills domain and 2.7 for the academic knowledge and skills domain.
- **Skills at kindergarten entry were higher for some child subgroups than for others.** Multilevel modeling indicated that the following groups had higher skills: children who were not eligible for the national school lunch program (relative to children who were eligible), girls (relative to boys), non-English learner children (relative to

English learner children), children who were not eligible for an individualized education program (relative to children who were eligible), and Asian and White children (relative to Hispanic and Black children). To help readers understand whether each difference is substantively meaningful for the academic knowledge and skills domain, the sizes of the gaps are reported as equivalent number of instruction days. For example, the gap between children eligible for the national school lunch program and those not eligible is equivalent to 51 days of kindergarten instruction. A gap of 18 days or more was considered substantively meaningful because research indicates that missing more than 10 percent of instructional time is negatively correlated with later student achievement.¹

- **As the percentage of children in a school who are eligible for the national school lunch program rises, child scores for both domains decline.** After child-level eligibility for the national school lunch program was controlled for, school-level poverty still had a statistically significant negative association with the academic knowledge and skills domain—but not with the learning and social skills domain.
- **Teachers and principals suggested several ways that their schools, districts, and the state can support administration of the Kindergarten Individual Development Survey.** Teachers and principals alike expressed uncertainty about how to use the survey data to inform their practice and whether the state would use the data for accountability purposes. They also reported that competing priorities were a barrier to administering the survey at the beginning of the school year and that using a play-based curriculum facilitated administration. Finally, teachers reported that the online data entry interface and the reports were difficult to use. Teachers and principals requested several revisions to survey training, such as making it appropriate for a wider group of school staff and including more information on choosing between adjacent rating categories.

Implications

The results of this study have several implications for the Illinois State Board of Education and local districts. The study's analyses of data from the 2017/18 administration of the Kindergarten Individual Development Survey support a finding that the survey measures two developmental domains. The state reports that the survey measures three developmental domains instead of the two identified in the current study. State and local education agencies could use the study's psychometric findings to label and describe the newly identified domains and to re-envision the reporting of survey results. In addition, if the skill gaps at kindergarten entry across child subgroups and schools hold in future years, state and local education agencies could consider providing targeted support to reduce the differences. Finally, if the opinions expressed in teacher and principal interviews are representative of broader teacher and principal opinions in Illinois, state and local education agencies could continue to demonstrate potential applications of the assessment data in the classroom and within school systems so that educators feel more invested in survey administration. Additional professional development could be considered to support the observation and rating of children in the context of developmentally appropriate instruction.

1. Romero, M., & Lee, Y. (2007). *A national portrait of chronic absenteeism in the early grades*. New York, NY: National Center for Children in Poverty, The Mailman School of Public Health at Columbia.

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